step of screening and reflowing of solder paste during installation of bottom components to the bottom surface **14**. During the screening of the bottom surface **14**, solder paste **64** is applied through the screen **62** to a bottom pad **66** to form a solder layer **68** (for subsequent mounting of a bottom component) and into the via void **34** to form a solder mass **69**. After the screen **62** is removed and the bottom component is attached to the solder layer **68**, the solder layer **68** and the solder mass **69** are reflowed causing affixation of the bottom component to the bottom surface **14** and redistribution of the solder mass **69** to form a plug.

The plug **70**, which is shown in FIG. 7, is capable of inhibiting the flow of molten solder into the via void **34** in the subsequent wave soldering step, which effectively inhibits heat transfer from molten solder to the top pad **32**. Generation of the plug **70** in the preceding screening and reflow step is essentially free of cost inasmuch as the screening and reflow is performed during the step of affixing the bottom component to the bottom surface **14**. For embodiments not requiring screening and reflow to affix a bottom component, a screening and reflow step could nevertheless be added to prevent heat transfer from molten solder to a top pad **32**.

Although the preferred embodiment of the present invention utilizes a screening and reflow process for generating a plug **70** in the via void **34**, any method for generating a volumetric plug within the via void **34**, that would effectively prevent heat transfer from molten solder to a top pad **32**, is within the scope of the present invention. Likewise, the plug material need not be solder and the plug may comprise any material capable of thermally insulating the via from the molten solder.

The present invention encompasses any embodiment that creates a plug in a via void even

wherein the end of the plug is at the bottom surface". Appellants maintain that in Fig. 12 of Amago, a top end of the plug (i.e., solder resist 107) is in the via 105 and **above** the bottom surface of the PCB, and a bottom end of the plug is **below** the bottom surface of the PCB. Appellants maintain that no end of the solder resist 107 is **at** the bottom surface of the printed circuit board, as required by claim 1. In addition, Amago discloses only the flow of molten solder at the top surface of the PCB into the hole 105 wherein the molten solder may contact only the top end of the plug (see Amago, col. 1, lines 48-51), and the top end of the plug is above the bottom surface of the PCB and not at the bottom surface of the PCB, as required by claim 1.

As a third example of why Amago does not teach each and every feature of claim 1, Amago does not teach a second feature of: "wherein the plug obstructs flow of the molten solder into the via". Amago discloses that molten solder that may enter the via 105 at the top of the via 105, resulting from soldering the chip component 104 to the land 106 (see Amago, col. 1, lines 48-51). Therefore, Appellants maintain that Amago does not disclose that the solder resist 107 obstructs flow of the molten solder into the via 105, but instead permits flow into the via 105 until being stopped by the plug of solder resist 107.

Based on the preceding arguments, Appellants respectfully maintain that Amago does not anticipate claim 1, and that claim 1 is in condition for allowance.

Claims 21-23

Since claims 21-23 depend from claim 1, which Appellants have argued *supra* to be not unpatentable under 35 U.S.C. §102(b), Appellants maintain that claims 21-23 are likewise not